

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

U.S. Patent

Application of: T. Oshiyama et al.

Serial Number : 10/795,850

Filed : March 08, 2004

For : ORGANIC ELECTROLUMINESCENT ELEMENT AND
DISPLAY EMPLOYING THE SAME

Group Art Unit: 1774

Examiner : Camie S. Thompson

DECLARATION UNDER 37 C.F.R. 1.132

Assistant Commissioner For Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

I, Tomohiro Oshiyama, hereby declare and say as follows:

That I am a post graduate from Tsukuba University having been awarded a Masters Degree in Science and engineering in March 1993.

That since April 1993, I have been employed by Konica Corporation (present Konica Minolta Holdings Inc.), the owner of the above-identified application. During my employment, I have been engaged in the research and the study of organic electroluminescent elements in the Research and Development Laboratory of my company.

That I am a co-inventor of the present application.

That I am familiar with the subject matter of the present invention.

What follows is an accurate summary of experiments conducted according to my detailed instructions and under my personal supervision, and the results obtained therefrom.

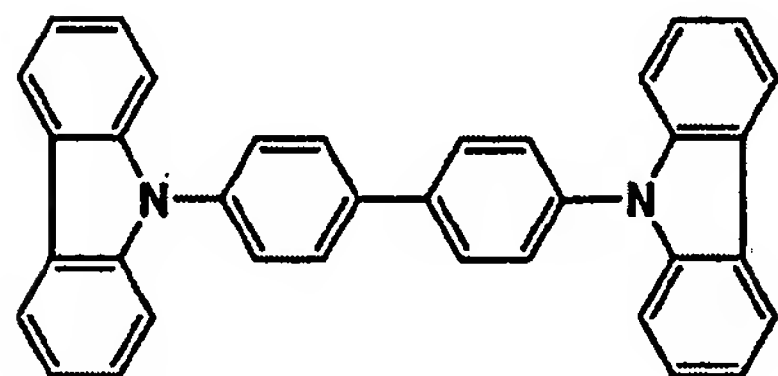
Comparative tests

1. Claims 1-7 and 9-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Thompson et al., U.S. Patent Number 6,902,830. The Examiner states on page 3, text lines 4-10 of the outstanding Office Action, "Thompson does not specifically disclose that the substituent on the phenylene group is substituted at the ortho-position to the chemical bond. Thomson does disclose possible substitution at any available carbon atom by alkyl or aryl groups. Substitution position on the compound affects HOMO and LUMO energies. Therefore, it would have been obvious to one of ordinary skill in the art to have the substituent at the ortho position in order to control current-voltage characteristics and the lifetime of the device. I disagree with this.

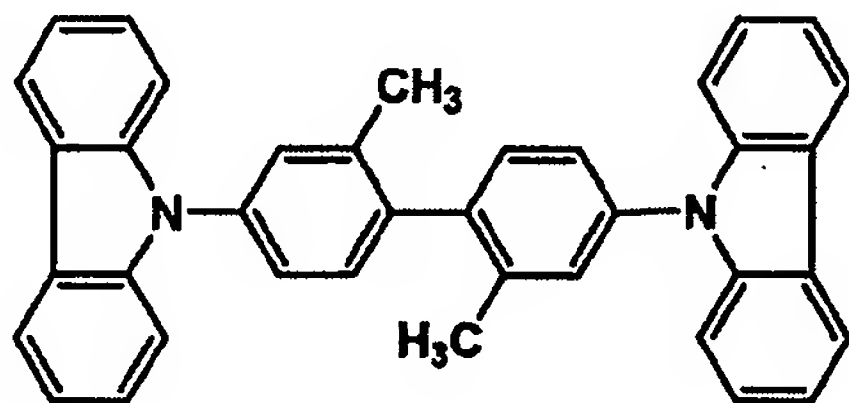
As the Examiner notes, Thompson does not specifically disclose that the substituent on the phenylene group is substituted at the ortho-position to the chemical bond. Thompson does not disclose that the substituent on the phenylene group at the ortho-position to the chemical bond is preferred. Rather, Thompson clearly teaches and suggests CBP as the preferred host material (Columns 32-33). Further, Thompson does not disclose the advantageous results of the invention that provide excellent emission luminance and long life-time.

2. In order to show the unexpected results of the invention, comparative tests were carried out employing, as a comparative compound, Thompson's preferred host material CBP (as shown below) or Compound C (as shown below) in which the substituent on the phenylene group is located at the meta-position to the chemical bond in instant formula 1. Herein, Compound C is closer in chemical structure to the invention than CBP and therefore, is considered to be closest prior art. Thus, organic EL element sample OLED C-1 was prepared in the same manner as organic EL element sample OLED 1-1 in Example 1 of the present Specification. Sample OLED C-1 comprised CBP as the host material. Organic EL element sample OLED C-2 was prepared in the same manner as organic EL element sample OLED C-1 above, except that Compound C was used instead of CBP. Organic EL element sample OLED I-1 was prepared in the same manner as an organic EL element sample OLED 1-2 in Example 1 of the present Specification. Sample OLED I-1 comprised TCBP1 (as shown below) as the host material.

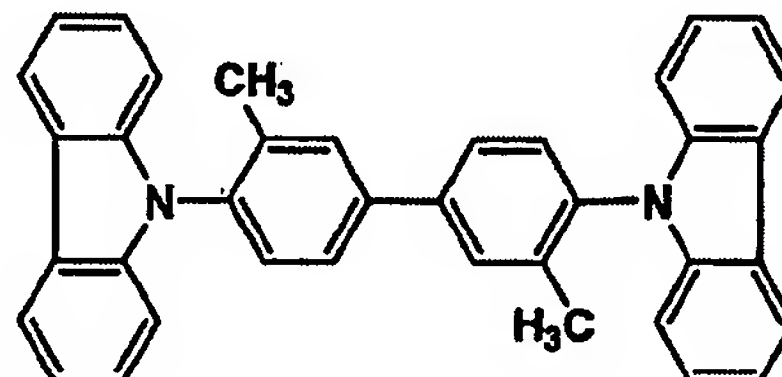
CBP



TCBP1



Compound C



The resulting samples were evaluated for emission luminance and emission lifetime in the same manner as in Example 1 of the present Specification. The results are shown in Table 4.

Table 4

| Sample OLED No. | Compound used in light emission layer | Reorganization energy (eV) | Emission luminance (%) | Emission lifetime (%) | Remarks |
|-----------------|---------------------------------------|----------------------------|------------------------|-----------------------|---------|
| C-1 | CBP | 0.56 | 100 | 100 | Comp. |
| C-2 | Compound C | 0.58 | 115 | 103 | Comp. |
| I-1 | TCBP1 | 0.41 | 165 | 135 | Inv. |

Comp.: Comparative, Inv.: Inventive

As is apparent from Table 4, Compound C, which has reorganization energy of 0.58, falls outside the claimed host compound, and inventive organic EL element sample OLED I-1 provides high emission luminance and long lifetime as compared with comparative organic EL element sample OLED C-1 employing CBP, which is disclosed in Thompson as the preferred host material, or comparative organic EL element sample OLED C-2 employing Compound C which is closer to the invention than CBP and therefore, is considered to be closest prior art. These results are unexpected to one of ordinary skill in the art. Therefore, it would not have been obvious to one of ordinary skill in the art to attain the subject matter of Claims 1, 9 and 10 over Thomson. In view of the above, I believe that claims 1, 9 and 10, and all the claims, which depend therefrom, will be in a situation of allowance.

I further declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001, of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Dated: September 21, 2007

Tomohiro Oshiyama

TOMOHIRO OSHIYAMA